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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,986	09/04/2003	Shin-Rung Lu	67,200-1145	9353

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EXAMINER	
DOTY, HEATHER ANNE	
ART UNIT	PAPER NUMBER
2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/656,986	LU ET AL.	
	Examiner	Art Unit	
	Heather A. Doty	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18,20 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18,20 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/29/2006 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless – (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10, 12-18, and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian et al. (U.S. 6,803,178).

Regarding claim 1, Subramanian et al. teaches a method for exposing a blanket photoresist layer (23 in Fig. 4A) to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate (61 in Fig. 7) having formed thereover a photoresist layer; and exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks, each of

said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern complexity subjected to a different photoexposure condition (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5, line 50; since the instant specification provides no special definition for "complexity," the examiner deems the pattern having more closely spaced features—the pattern on the left—more complex than the pattern having less closely spaced features—the pattern on the right).

Regarding claim 6, Subramanian et al. teaches a method for exposing a photoresist layer (23 in Fig. 4A) to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate (61 in Fig. 7) having formed thereover a photoresist layer; and exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks and two exposure conditions, each of said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern density (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5, line 50) and a different pattern complexity subjected to a different photoexposure condition (Fig. 4 shows a first pattern on the left comprised of three closely spaced via patterns and a second pattern on the right comprised of two less closely spaced via patterns; since the instant specification provides no special definition for "complexity," the examiner deems the pattern having more closely spaced features—the pattern on the left—more complex than the pattern having less closely spaced features—the pattern on the right).

Regarding claim 14, Subramanian et al. teaches a method for forming a patterned layer to achieve optimal photoexposure conditions to produce different non-overlapping die patterns comprising:

providing a substrate having formed thereover a target layer (21 in Fig. 4A) having formed thereover a photoresist layer (23 in Fig. 4A);

exposing within a single die region within the photoresist layer a minimum of two non-overlapping die sub-patterns while employing a minimum of two masks, to form an exposed photoresist layer, each of said masks associated with one of said non-overlapping die sub-patterns, each of said non-overlapping die patterns comprising a different pattern density (Figs. 4A-4D, 5A-5D; column 4, lines 18-column 5, line 50) and a different pattern complexity subjected to a different photoexposure condition (Fig. 4 shows a first pattern on the left comprised of three closely spaced via patterns and a second pattern on the right comprised of two less closely spaced via patterns; since the instant specification provides no special definition for "complexity," the examiner deems the pattern having more closely spaced features—the pattern on the left—more complex than the pattern having less closely spaced features—the pattern on the right);

developing the exposed photoresist layer to form a patterned photoresist layer (column 4, lines 58-67; column 5, lines 51-61); and

processing the target layer to form a processed target layer while employing the patterned photoresist layer as a mask (column 5, lines 1-10 and 62-67).

Regarding claims 2, 3, 7, 8, 15 and 16, Subramanian et al. teaches the method of claims 1, 6, and 14, and further teaches that the substrate is a semiconductor substrate or a ceramic (glass) substrate (column 6, lines 20-25).

Regarding claims 4, 5, 9, 10, 17, and 18, Subramanian et al. teaches the method of claims 1, 6, and 14, and further teaches that the photoresist layer is formed of a positive photoresist layer (Figs. 4A-4D; column 4, lines 18-20) or a negative photoresist layer (Figs. 5A-5D; column 5, lines 10-12).

Regarding claims 12, 13, and 20, Subramanian et al. teaches the method of claims 6 and 14, and further teaches that the photoexposure condition includes depth of focus and illumination (column 5, lines 29-50).

Regarding claim 21, Subramanian et al. teaches the method of claim 1, wherein each of said non-overlapping die patterns further comprises a different pattern density (Figs. 4A-4D, 5A-5D).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian et al. (U.S. 6,803,178) in view of Lai et al. (U.S. 6,187,486).

Regarding claim 11, Subramanian et al. teaches the method of claim 6 (note 35 U.S.C. 102(e) rejection above, but does not teach that the photoexposure condition includes exposure energy.

Lai et al. teaches that exposure energy is an exposure conditions that affects the linewidth of exposed photoresist (column 1, lines 48-67).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Subramanian et al., and further use a minimum of two exposure conditions including exposure energy, in order to modify the linewidth of the photoresist patterns, as taught by Lai et al., for the various sub-pattern exposures.

Response to Arguments

Applicant's arguments filed 8/29/2006 have been fully considered but they are not persuasive.

Applicant initially argues that the Office action dated 5/30/2006 was erroneously made final because the newly applied art was not necessitated by Applicants' amendment (bottom of p. 9). Applicant further points out that this action was the second containing different art made in rejections. The examiner does not find this argument persuasive. While it is true that the action dated 11/9/2005 contained art used in rejections not applied in the action dated 6/9/2005, the examiner made the action dated 11/9/2005 non-final, to allow Applicant the opportunity to respond to the new rejections. Regarding the alleged premature finality of the action dated 5/30/2006, Applicant's amendment that limited the non-overlapping die sub-patterns to be different patterns

necessitated a new search and new grounds of rejection. Therefore, the finality of the action stands.

Next Applicant argues (p. 11-16) regarding the rejections made under 35 U.S.C. 102(e) that Subramanian et al. does not read on the claims as amended because Subramanian et al. does not teach that the die sub-patterns have a different pattern complexity. However, as pointed out in the rejection above, Applicant does not provide a special definition for the broad term "complexity." Therefore it is reasonable for one of ordinary skill in the art to be of the position that a densely packed group of features is more complex than a loosely packed group of features. Subramanian et al. teaches that the left and right die sub-patterns illustrated in Fig. 4 have both different pattern density and complexity.

The examiner withdraws the rejection of claims 1 and 3 over Aoki et al. in view of Shibuya et al. in light of Applicant's amendment. Although Aoki et al. teaches that the non-overlapping die patterns comprise different patterns, Aoki et al. does not offer details regarding the complexity of the different patterns.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather A. Doty, whose telephone number is 571-272-8429. The examiner can normally be reached on M-F, 8:30 - 2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 571-272-1702. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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CARL WHITEHEAD, JR.
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